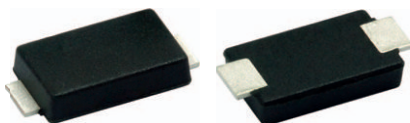


# Surface Mount Trench MOS Barrier Schottky Rectifier

TMBS® SlimSMA™



Top View

Bottom View

DO-221AC

## FEATURES

- Very low profile - typical height of 0.95 mm
- Ideal for automated placement
- Trench MOS Schottky technology
- Low power losses, high efficiency
- Low forward voltage drop
- Meets MSL level 1, per J-STD-020, LF maximum peak of 260 °C
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



**RoHS**  
COMPLIANT  
HALOGEN  
**FREE**

## MECHANICAL DATA

**Case:** DO-221AC (SlimSMA)

Molding compound meets UL 94 V-0 flammability rating  
Base P/N-M3 - halogen-free, RoHS-compliant, and commercial grade

**Terminals:** Matte tin plated leads, solderable per J-STD-002 and JESD22-B102

M3 suffix meets JESD 201 class 2 whisker test

**Polarity:** Color band denotes cathode end

## PRIMARY CHARACTERISTICS

|                        |                    |
|------------------------|--------------------|
| $I_{F(AV)}$            | 5.0 A              |
| $V_{RRM}$              | 50 V               |
| $I_{FSM}$              | 100 A              |
| $V_F$ at $I_F = 5.0$ A | 0.41 V             |
| $T_J$ max.             | 150 °C             |
| Package                | DO-221AC (SlimSMA) |
| Diode variations       | Single die         |

## TYPICAL APPLICATIONS

For use in low voltage, high frequency inverters, freewheeling, DC/DC converters, and polarity protection applications.

## MAXIMUM RATINGS ( $T_A = 25$ °C unless otherwise noted)

| PARAMETER                                                                         | SYMBOL         | VSSAF5N50   | UNIT |
|-----------------------------------------------------------------------------------|----------------|-------------|------|
| Device marking code                                                               |                | 5N5         |      |
| Maximum repetitive peak reverse voltage                                           | $V_{RRM}$      | 50          | V    |
| Maximum DC forward current (fig. 1)                                               | $I_F^{(1)}$    | 5.0         | A    |
|                                                                                   | $I_F^{(2)}$    | 3.0         |      |
| Peak forward surge current 10 ms single half sine-wave superimposed on rated load | $I_{FSM}$      | 100         | A    |
| Maximum DC reverse voltage                                                        | $V_{DC}$       | 35          | V    |
| Operating junction and storage temperature range                                  | $T_J, T_{STG}$ | -40 to +150 | °C   |

### Notes

(1) Mounted on 10 mm x 10 mm pad areas, 2 oz. FR4 PCB

(2) Free air, mounted on recommended copper pad area

| ELECTRICAL CHARACTERISTICS (T <sub>A</sub> = 25 °C unless otherwise noted) |                        |                         |                               |      |      |      |
|----------------------------------------------------------------------------|------------------------|-------------------------|-------------------------------|------|------|------|
| PARAMETER                                                                  | TEST CONDITIONS        |                         | SYMBOL                        | TYP. | MAX. | UNIT |
| Instantaneous forward voltage                                              | I <sub>F</sub> = 2.5 A | T <sub>A</sub> = 25 °C  | V <sub>F</sub> <sup>(1)</sup> | 0.41 | -    | V    |
|                                                                            | I <sub>F</sub> = 5.0 A |                         |                               | 0.48 | 0.56 |      |
|                                                                            | I <sub>F</sub> = 2.5 A | T <sub>A</sub> = 125 °C |                               | 0.31 | -    |      |
|                                                                            | I <sub>F</sub> = 5.0 A |                         |                               | 0.41 | 0.50 |      |
| Reverse current                                                            | V <sub>R</sub> = 35 V  | T <sub>A</sub> = 25 °C  | I <sub>R</sub> <sup>(2)</sup> | 0.02 | -    | mA   |
|                                                                            |                        | T <sub>A</sub> = 125 °C |                               | 12   | -    |      |
|                                                                            | V <sub>R</sub> = 50 V  | T <sub>A</sub> = 25 °C  |                               | -    | 1.4  |      |
|                                                                            |                        | T <sub>A</sub> = 125 °C |                               | 19   | 50   |      |
| Typical junction capacitance                                               | 4.0 V, 1 MHz           |                         | C <sub>J</sub>                | 850  | -    | pF   |

**Notes**

(1) Pulse test: 300  $\mu\text{s}$  pulse width, 1 % duty cycle

(2) Pulse test: Pulse width  $\leq 40\text{ ms}$

| <b>THERMAL CHARACTERISTICS</b> ( $T_A = 25\text{ }^{\circ}\text{C}$ unless otherwise specified) |                       |           |                      |
|-------------------------------------------------------------------------------------------------|-----------------------|-----------|----------------------|
| PARAMETER                                                                                       | SYMBOL                | VSSAF5N50 | UNIT                 |
| Typical thermal resistance                                                                      | $R_{\theta JA}^{(1)}$ | 115       | $^{\circ}\text{C/W}$ |
|                                                                                                 | $R_{\theta JM}^{(1)}$ | 12        |                      |

**Note**

(1) Free air, mounted on recommended PCB, 2 oz. pad area; thermal resistance  $R_{\theta JA}$  - junction to ambient

| <b>ORDERING INFORMATION</b> (Example) |                 |                        |               |                                    |
|---------------------------------------|-----------------|------------------------|---------------|------------------------------------|
| PREFERRED P/N                         | UNIT WEIGHT (g) | PREFERRED PACKAGE CODE | BASE QUANTITY | DELIVERY MODE                      |
| VSSAF5N50-M3/6A                       | 0.032           | 6A                     | 3500          | 7" diameter plastic tape and reel  |
| VSSAF5N50-M3/6B                       | 0.032           | 6B                     | 14 000        | 13" diameter plastic tape and reel |

**RATINGS AND CHARACTERISTICS CURVES**

( $T_A = 25\text{ }^{\circ}\text{C}$  unless otherwise noted)

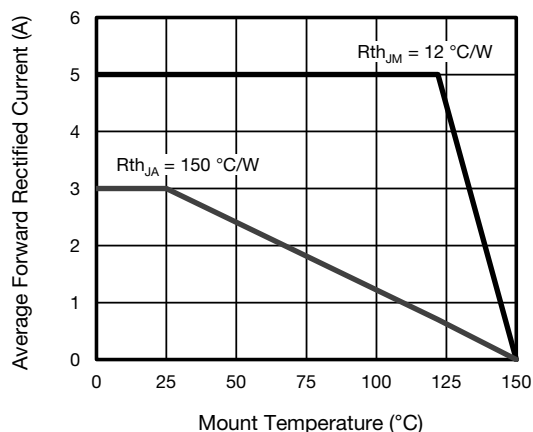


Fig. 1 - Maximum Forward Current Derating Curve

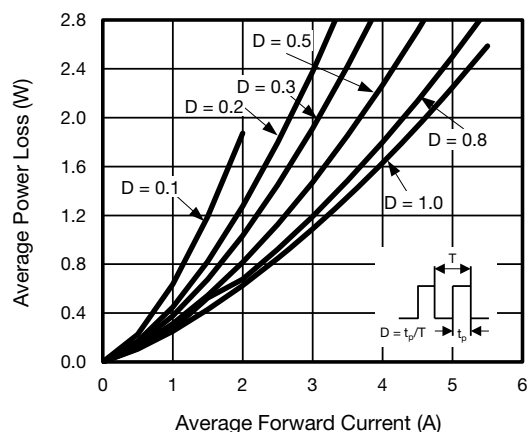


Fig. 2 - Average Power Loss Characteristics

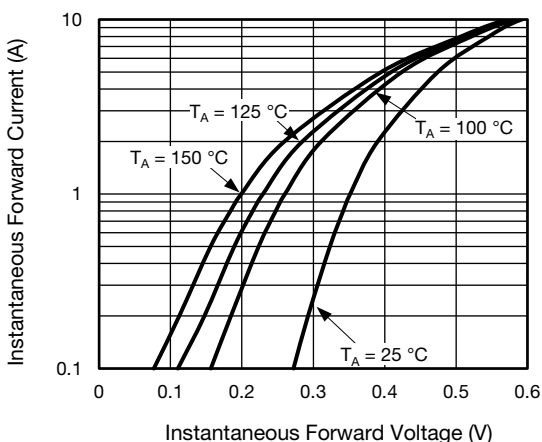


Fig. 3 - Typical Instantaneous Forward Characteristics

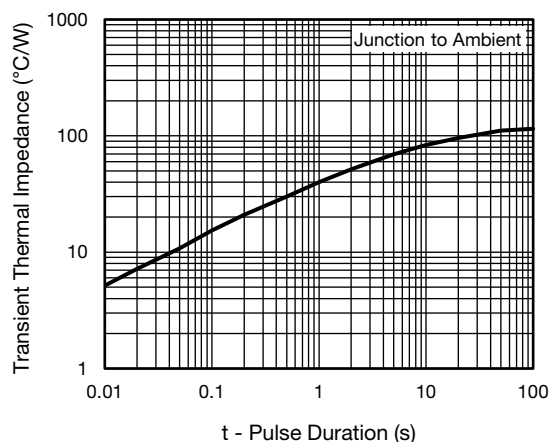


Fig. 6 - Typical Transient Thermal Impedance

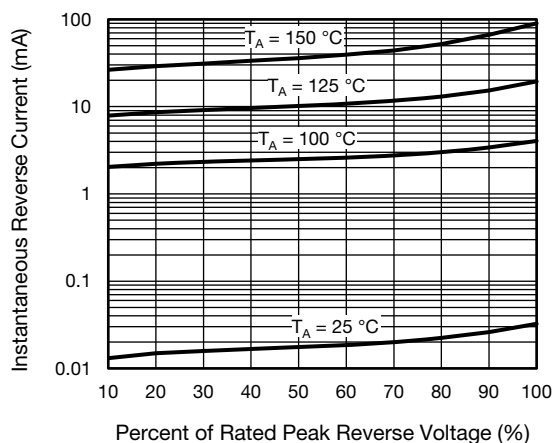


Fig. 4 - Typical Reverse Leakage Characteristics

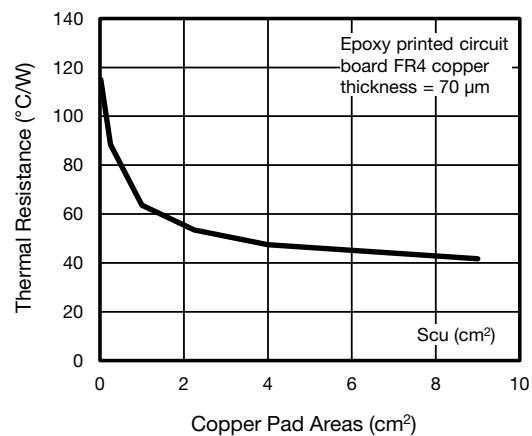


Fig. 7 - Thermal Resistance Junction to Ambient vs. Copper Pad Areas

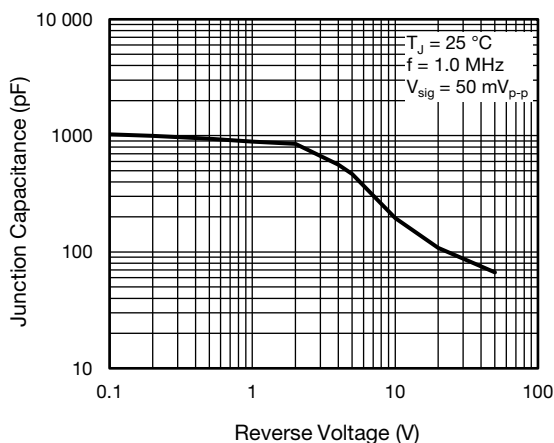
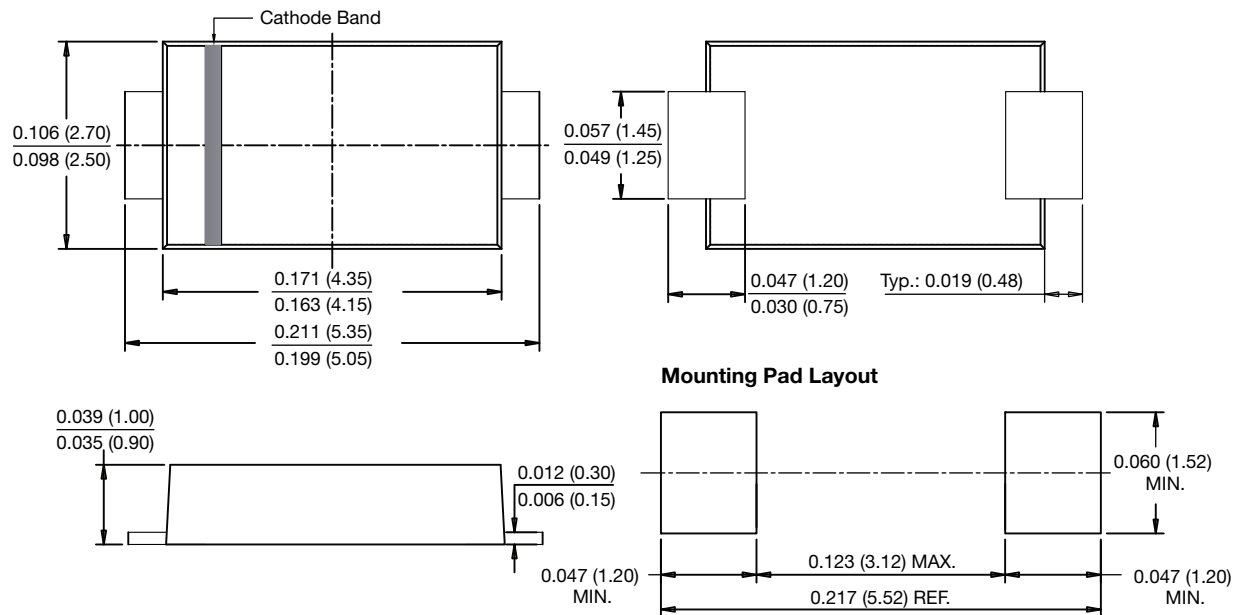


Fig. 5 - Typical Junction Capacitance



**PACKAGE OUTLINE DIMENSIONS** in inches (millimeters)

**DO-221AC (SlimSMA)**





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